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Locking lever arrangement, in particular, for retaining two articulated parts in the open state

The present invention relates to a locking lever arrangement for keeping open two articulated parts in predefined pivoting boundary positions, particularly for holding upwardly foldable device parts in their upwardly folded position.

In arrangements of this type disclosed in the prior art, a locking lever is often designed as a single-arm lever, the free end of which is fixed in the locked position, e.g. by interlocking it or snapping it in place. It is also known from the prior art to provide that end of the locking lever that is to be snapped into position, with a guideway comprising a latch mechanism, which is engaged automatically in the open position. These designs disclosed in the prior art suffer from the shortcoming of requiring large space, which is particularly disadvantageous when such known locking lever arrangements take up useable space in the interior of housings. Furthermore, they often do not provide the desired locking reliability, especially when locking pivoting device parts requiring the performance of

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assembly work or maintenance work even in harsh environmental conditions such as on ships by way of example or in the case of device parts assuming positions that can change in space.

The object underlying the invention is to provide a locking lever arrangement of the type mentioned in the introduction, which locking lever arrangement acts automatically during the pivoting action of the components or device parts and ensures a reliable locking effect independently of the position in space and has a simple and compact design. The locking lever device is provided with a design that is ideal in terms of production and capable of being dimensioned for a wide load range without any basic change in its shape and mode of operation.

This object is achieved according to the invention by designing the locking lever as a joint comprising a tension spring connecting two toggle levers and a stop limiter of the bending movement beyond the dead-center position. This arrangement not only has the advantage of providing a reliable locking effect irrespective of the position in space, but is also characterized by required properties such as great simplicity in terms of

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design and low space requirement since the joint is folded to half its length in the closed position.

Indeed, it is already known in principle to provide e.g. doors or flaps with tension springs, which bring about a return movement into the rest position on this side of their dead-center position, and a snapping movement on the other side of the dead-center position until the moved part meets a stop.

The necessity of such separate stop points is often disadvantageous in terms of design, particularly in parts, which are to be folded upwards and whose weight must then be supported by the tension spring alone in this known solution.

These disadvantages do not show up in the solution suggested by the present invention in which the weight of the moving device parts is supported against the appropriately dimensioned joint construction located in a stable position without requiring additional auxiliary construction fixed otherwise to the moving device parts.

A particularly advantageous design results by producing both the toggle levers from uniform punching parts. They can be provided with integrally molded stop flaps, which are bent off at a common

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plane, and projections, which are bent off laterally out of the pivot space of the locking lever and are used as the working points of the tension spring.

The invention has special significance for ensuring the locking reliability of heavy, sensitive, and expensive device parts, which are disposed in such a way for purposes of inspection and repairs that they can be swiveled upward out of the housing. The invention can be applied wherever swivel-mounted components are required to be retained in predefined pivoting boundary positions. The locking lever arrangement is thus also advantageously suitable for locking windows or doors in the open position since it ensures a reliable locking effect even during the action of strong forces, such as e.g. dead weight, wind pressure et al.

In the drawings, which illustrate the invention with reference to an exemplary embodiment,

Fig. 1 shows a locking lever arrangement of the invention in the supported end position,

Fig. 2 shows a lateral view of Fig. 1, and

Fig. 3 shows a partial section taken along line III-III marked in Fig. 1.

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The illustrated locking lever arrangement consists of a joint [redacted] with two toggle levers 1a, 1b, which are articulated by means of an axis of articulation 2 designed as a hollow rivet and a tension spring 3 acting on both toggle levers *1a, 1b*. The two toggle levers 1a, 1b are composed of uniform punching parts. For delimiting the bending movement on the other side of the dead-center position, the toggle levers 1a, 1b are provided, as shown in Fig. 1 and 2, with integrally molded stop flaps 4a, 4b, which are bent off in a common plane.

According to the invention, it is usually sufficient to bend only one of the stop flaps 4a, 4b to such an extent that it extends into the plane of the other toggle lever arm 1a, b.

Furthermore, the toggle levers 1a, 1b are provided with integrally molded projections 5a, 5b, which are bent off sideways out of the pivot space of the locking lever and are used as the working points of the two ends of the tension spring. There are bores 6a, 6b located on the ends of the toggle lever 1a, 1b for receiving pins for articulating the locking lever with the components or device parts, which can swivel against each other

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and are connected by the locking lever arrangement for being retained in the swiveled-out position. There is no connection with the device parts on the axis of articulation 2. The toggle lever 1a can be articulated, for example, with the housing of a device while the toggle lever arm 1b acts on a device part, which can be swiveled upwards out of the housing of the device.

For unlocking, it is merely necessary to lift the swiveling device part slightly against the tensile force of the tension spring 3, which is stressed in the stop position and to move the joint [redacted] at a suitable location between 6a and 6b, preferably in the vicinity of the axis of articulation 2, beyond the dead-center position.

The tension spring 3 is initially stressed until the swivel movement passes through the dead-center position. Thereafter, the return swivel movement of the device part into the housing is supported by the tension spring 3. The folding movement is delimited by the overall swivel angle of the device part, which angle is adapted to meet the circumstances present in each case.

When used as a locking arrangement for windows, one toggle lever *1a* must be attached to the window frame, while the other toggle

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lever *1b* must be attached to the casement and can be provided with a handle, which enables the joint to be unlocked when closing the window by applying slight pressure inwards.

- Claims -

CLAIMS:

1. Locking lever arrangement for keeping open two articulated parts in predefined pivoting boundary positions, particularly for holding upwardly foldable device parts in their upwardly folded position, said locking lever arrangement being characterized in that the locking lever is designed as a joint (1) comprising a tension spring (3) joining two toggle levers (1a, 1b) and comprising a stop limiter for the bending movement beyond *the* dead-center position.

2. Arrangement according to Claim 1 characterized in that the two toggle levers (1a, 1b) are composed of uniform punching parts.

3. Arrangement according to Claim 2 characterized in that the toggle levers (1a, 1b) are provided with integrally molded stop flaps (4a, 4b), which are bent off in a common stop plane.

4. Arrangement according to Claims 2 and 3 characterized in that the toggle levers (1a, 1b) are provided with integrally molded projections (5a, 5b), which are bent off sideways out of the pivot space of the locking lever and are used as the working points of the tension spring (3).

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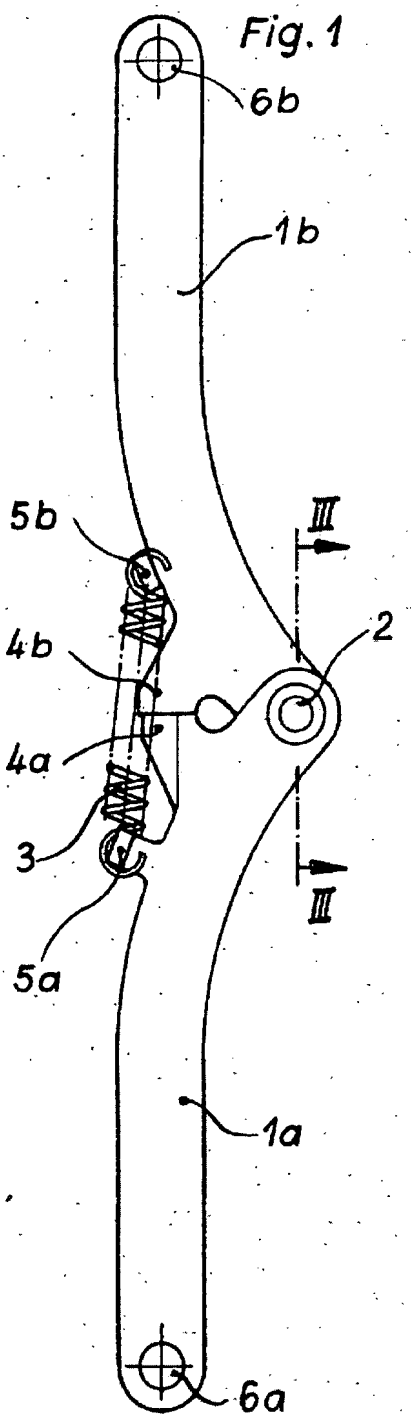
Fig. 1



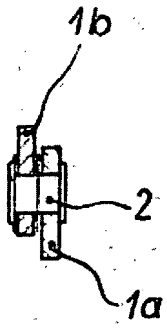


Fig. 3

Fig. 2